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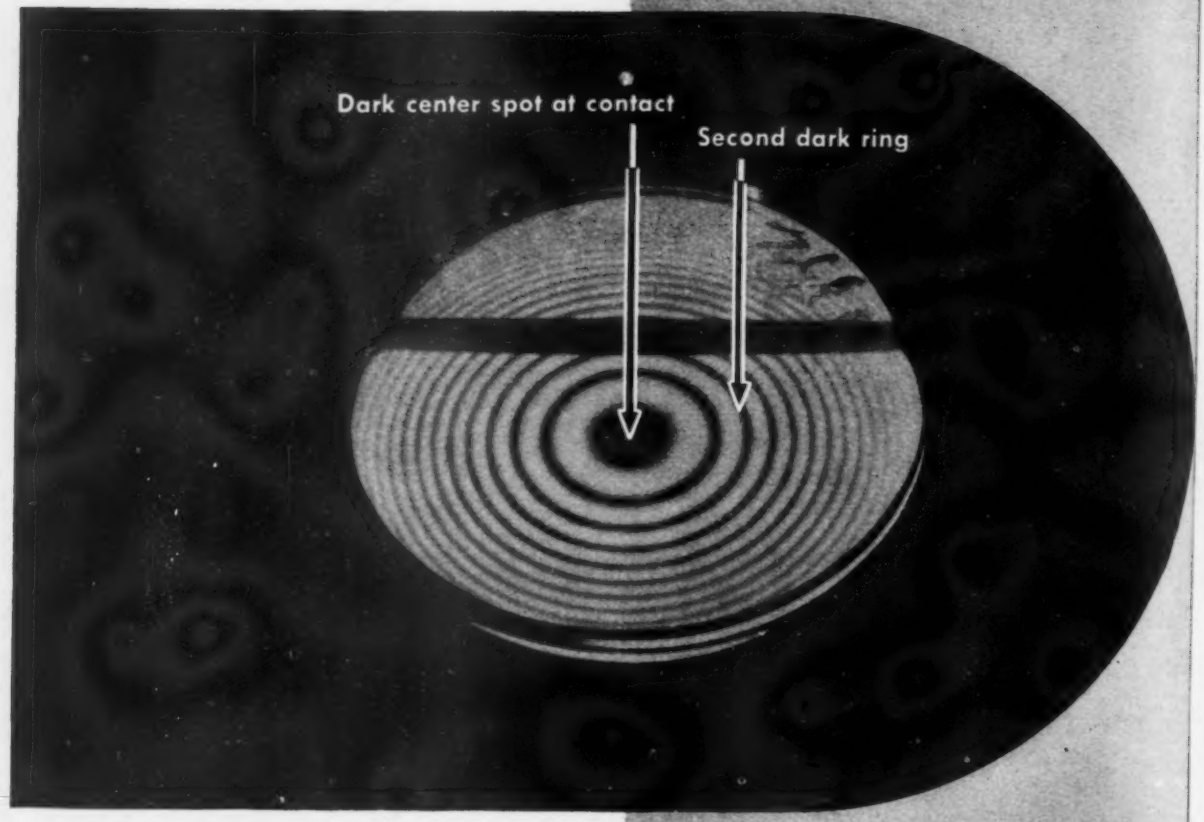


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Vol. 20 — No. 6


## CONTENTS


Page

ORIGINAL PAPERS

Theoretical Treatment of Ophthalmometry Through the Correction Lens. Paul S. Cline ..... 193

A Critical Evaluation of "Ophthalmometry Through the Corection Lens." Julius F. Neumueller ..... 200

EDITORIALS

Eyes of the British Air Force ..... 204

BOOK NOTICES AND REVIEWS

Excerpts from Aldous Huxley's new book, "The Art of Seeing." A. Virginia Flatten ..... 207

SPECIAL REPORT

Optometric Public Relations. Ewing Adams ..... 213

Optometric Professional Economics. James A. Palmer ..... 216

TRANSACTIONS OF THE ACADEMY by J. Fred Andreae ..... 225

ANNOUNCEMENTS ..... 226

ABSTRACTS ..... 229

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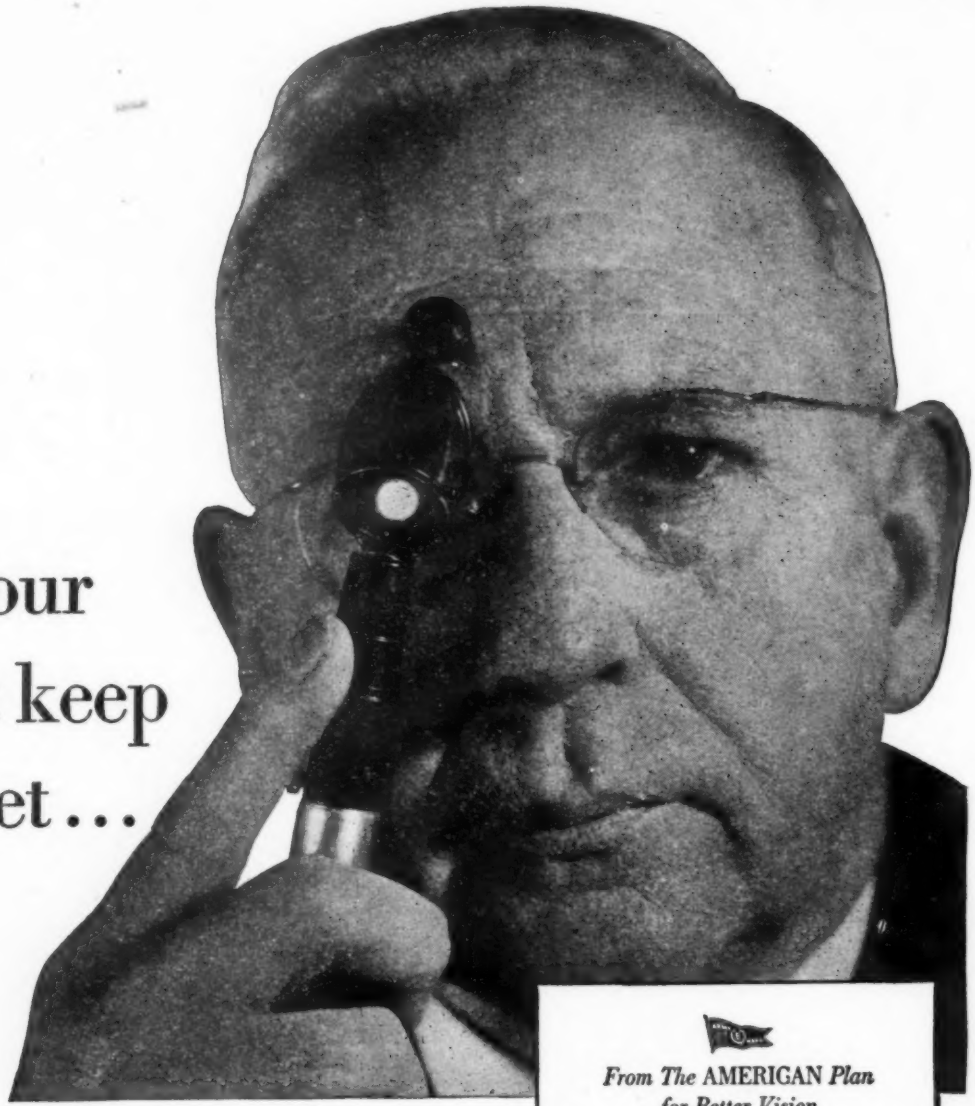

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# THEORETICAL TREATMENT OF OPHTHALMOMETRY THROUGH THE CORRECTION LENS*

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In the March issue of the AMERICAN JOURNAL OF OPTOMETRY AND ARCHIVES OF THE AMERICAN ACADEMY OF OPTOMETRY, a paper by Ryer and Hotaling appeared, which dealt with an "empiric technique," for determining the correction for the total ocular astigmia by using lenses in combination with the ophthalmometer. The authors state that the technique is not infallibly effective "as no one acquainted with the vagaries of the human binocular organism, would look for infallibility in this or other optometric technique."

Their technique for determining the total correction for the astigmia of a given patient, consisted of placing the indicated trial cylinder with its axis rotated ninety degrees in front of the patient and obtaining the keratometric readings through the lens of the apparent horizontal and vertical meridians. If the resultant apparent astigmia is approximately .50 diopters with-the-rule, the trial cylinder is seemingly correct. If the resultant astigmia is not approximately .50 diopters with-the-rule, the power of the trial cylinder should be altered until the proper resultant is obtained. In addition "empiric technique No. 2," the authors state, "enjoyed the advantage of using the patient's own lens which included any spherical element his ametropia may have called for." And in step 4, "In any case the cylindrical component of any correction was considered accurate *only when* through it, with its axis reversed 90°, the ophthalmometer disclosed a half-diopter with-the-rule astigmia in the horizontal and vertical meridians.

Since the ophthalmometer is simply an optical device for measuring the size of a reflected image on the cornea, and since the laws pertain-

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ing to paraxial rays are of the most elementary form, it is not too much to assume that the readings obtained keratometrically should be very precise and quite independent of the "vagaries of the human binocular organism." With this in mind, the writer proceeded to derive the fundamental equations of the apparent corneal readings through a correction lens. Before so doing, however, it might be well to review some of the necessary elementary principles pertaining to the optics of the cornea.

The ophthalmometer measures, as we know, the radius of the corneal meridian (approximately) from which can be deduced the reflecting power of the mirror. By assuming an index usually 1.3375 (with the exception of the C-I instrument) the dioptral power can be recorded. In other words for a given radius, a dioptral power may be assumed, and the instrument so calibrated, much in the same manner as a galvanometer may be calibrated to record volts or amperes. It is important to note that the dioptral readings depend upon the catoptral power, an increase in one bringing about an increase in the other.

The dioptral power at a point of a spherical surface for incidence at small angles (paraxial rays) in air is given by the fundamental formula

$$D = \frac{n-1}{r} \qquad (1)$$

where D is the refracting power in diopters, n the index of the medium (in the case of the corneal measurement about 1.3333) and r the radius of the cornea in meters. The reflecting power for paraxial rays is given by the formula (1) by changing n to —1 in which case

$$C = -\frac{2}{r} \qquad (2)$$

where C is the reflecting power in diopters.

Dividing equation (2) by (1), we have

$$\frac{C}{D} = \frac{-2}{n-1} \qquad (3)$$

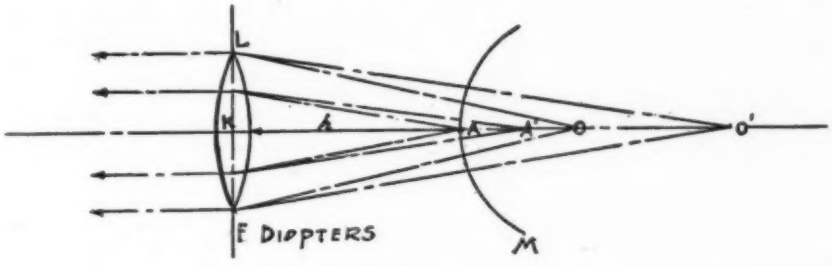
the ratio for the reflecting and refracting powers of the cornea.

Since the instrumental index does differ from 1.333 by a negligible amount, we assume 1.3333 for our corneal index for keratometric purposes, and thus obtain in (3)

$$\frac{C}{D} = \frac{-2}{.3333} = -\frac{6}{1} \qquad (4)$$

Thus the reflecting power of the cornea is approximately six times its refracting power, but opposite in sign. That is if the dioptral reading is 40, the reflecting power is about —240 diopters. If the reflecting power is —246, the refracting reading will be 41 diopters.

If a minus sphere be placed before the cornea, the dioptral reading will be greater, because the negative power of the lens is added to the negative reflecting power of the cornea, making the system more powerful, and likewise reducing the size of the final image which is to be measured. If the reflecting power is increased, the dioptral reading is increased since the equivalent radius of the compound reflecting system is less.




In Fig. 1, M represents the cornea, whose vertex is at A and whose radius is AO, O being the center of curvature. A thin lens L of power F diopters, is placed h meters from the corneal vertex, h being defined as the distance AK, and not KA. The system is in reality a three-component system, since light traverses the lens twice, once before and once after the corneal reflection, and therefore the optics is that of a three-component system, symmetrical with respect to the middle component. The formulae for a three-component system are rather cumbersome and therefore the method of the apparent surface is much more desirable, while yielding exactly the same equations.

In this method, both A and O act as objects for the lens, the images being designated by A′ and O′. A′ then is the apparent vertex and O′ the apparent center, the interval A′O′ being the apparent radius, the magnitude of which determines the corneal reading. Taking A as the object, we obtain using the fundamental paraxial formula for conjugate powers:

$$\frac{1}{h} + F = \frac{1}{h'} \quad \text{where } h' \text{ is the distance } A'K' \tag{5}$$

$$\text{or} \quad h' = \frac{h}{1 + Fh}$$

the distance from the lens to the apparent cornea therefore is —h'.

Now O is taken as the object, the object distance being KO, and we obtain

$$\frac{1}{OK} + F = \frac{1}{O'K'}$$

Since $OK = OA + AK = -r + h$ and
$O'K' = O'A' + A'K' = -r' + h'$ we have

$$\frac{1}{-r + h} + F = \frac{1}{-r' + h'}$$

$$\frac{1 + Fh - Fr}{h - r} = \frac{1}{h' - r'}$$

$$r' = h' - \frac{h - r}{1 + Fh - Fr}$$

Substituting for h' from

$$r' = \frac{h}{1 + Fh} - \frac{h - r}{1 + Fh - Fr}$$

Combining

$$(6) \qquad r' = \frac{r}{(1 + Fh)^2 - 1 + Fh)\ Fr}$$

$$r' = \frac{n - 1}{D'} \text{ and } r = \frac{n - 1}{D}$$

$$\frac{n-1}{D'} = \frac{\frac{n-1}{D}}{(1 + Fh)^2 - \frac{(1 + Fh)\ (n-1)}{D}}$$

Finally $D' = D\ (1 + Fh)^2 - F\ (n-1)\ (1 + Fh)$

Where D′ = is the apparent corneal reading
D = Reading before the lens is added
n = instrumental index

If n is taken as 4/3 then

$$D' = D\ (1+ Fh)^2 - \frac{F}{3}\ (1 + Fh) \qquad (7)$$

This equation shows that the apparent reading not only depends upon the actual reading before the lens is added, but also upon the distance of the lens as well as its power. If h is put equal to zero, we have the following:

$$D' = D\ \frac{-F}{3} \qquad (8)$$

Therefore if a lens could be placed at the cornea, the reading would differ by 1/3 the power of the lens added. For example, if the corneal reading were 40 diopters before the lens was inserted, the reading through a plus 3 sphere at the cornea would be 39, and through a —9 would be 43 diopters as can be verified by substituting values in equation (8). The corneal astigmatism through a spherical lens at the cornea would theoretically remain unchanged, as can be shown by assuming two value for D, one for each of the two principal directions, and showing a difference is a constant for a given case.

Practically, however, lenses are placed not at the cornea, but at some convenient distance as —14 mm. Our friends Ryer and Hotaling suggest —13.75; however, I shall not be as exact. If a —2.00 sphere be placed —14 mm. from a cornea, whose ophthalmometric reading is 40 diopters, the new reading will not be 42 diopters as Ryer and Hotaling suggest but will be by equation (7).

$$D' = 40\ [1 + (-2)\ (-.014)]^2 - \frac{2}{3}\ [1 + (-2)\ (-.014)]$$

D′ = 42.96 or practically 43D

If the corneal reading is 50 diopters before the addition of the —2.00 sphere, the reading of the apparent surface will be 53.54 diopters, so that the variation of the change in power occurs, because the apparent reading is a function of the true reading.

If we take equation (7) and employ it for each of two principal meridians, the primary having the subscript 1 and the secondary the subscript 2, we have

$$D'_2 = D_2 (1 + Fh)^2 - \frac{F}{3} (1 + Fh)$$

$$D'_1 = D_1 (1 + Fh)^2 - \frac{F}{3} (1 + Fh)$$

by subtraction

$D'_2 - D'_1 = (D_2 - D_1) (1 + Fh)^2$ or

$A' = A (1 + Fh)^2$ (9)

Where A is the corneal astigmatism prior to the addition of the lens and A′ is the resultant apparent astigmatism of the entire system.

Thus the astigmatic reading through a sphere will differ from the original by the quantity 2 AFh (approx.) which can be obtained from equation (9) by expanding and neglecting $h^2$ as being of a higher order.

If we assume a patient has 5D with-the-rule, the astigmatic reading through a +5.00 sphere at 14 mm. will be

$A' = (+ 5) [(1. + (5) (-.014)]^2 = +4.35$

$A' = (+ 5) (.93)^2 = + 4.35$, or 4.35 with-the-rule.

Through a —5.00 sphere the astigmatic reading of the same eye would be.

$A' = (+ 5) (1.07)^2 = + 5.7$ or 5.7 with-the-rule.

Thus a significant variation of the astigmia occurs through a spherical lens of moderate power quite enough to vitiate any "rule-of-thumb" or "empiric" techniques.

The astigmatic reading through a cylinder whose principal meridians are parallel to those the cornea, may be obtained from equation (7) by substituting $F_1$ for one principal power of the lens and $F_2$ for the other power. If the lens is a simple cylinder, one of the powers is zero, and therefore $D' = D$ in that direction.

In example (1) on page 79 in the March issue of the AMERICAN JOURNAL OF OPTOMETRY, the initial ophthalmometric readings are primary 40D along the 180 meridian and 42D along the vertical. The indicated cylindrical lens according to tables was —1.5 x 180, which then was placed with its axes reversed thereby adding no power along the vertical which should still record 42D, and changing the horizontal to, the authors say, 41.50. This change according to equation (7) does not occur since

$D' = [40] [1 + (-1.50) (-.014)]^2 -$

$$\left[\frac{-1.5}{3}\right]\left[1 + (-.014)\ (-1.5)\right]$$

$$D' = +42.19$$

The result therefore is 42.19 diopters horizontal and 42 vertically. If their premise (which is very questionable) is correct, that .5 with the rule should result, then this cylindrical lens is incorrect since a resultant of .19D against-the-rule is obtained.

In addition it may be shown that the spherical element of a toric lens will alter the astigmatic reading even if the cylindrical element is unchanged so that the attempt to verify correction lens through ophthalmometry may be termed naive.

The writer has carefully checked numerous patients and the results obtained differed but little from the theoretic results. The instrument used was a Bausch and Lomb keratometer which is as sensitive to axial and dioptral variations as any of the other types.

In conclusion, it may be stated that the writer believes—

(1) That the ophthalmometry through a correction lens opens no new field in optometric research and that the findings can be anticipated by the application of well worn optical principles.

(2) That total ocular astigmia can only be determined by light passing through the entire optical system of the eye.

(3) That the optical system of the eye is a complex system, and the assymmetries and complicated ray procedures through a large relative aperture as the pupil make it impossible to obtain the ocular astimatism by a restricted measurement of one of the ocular surfaces, however important it may be.

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BOSTON, MASS.

# A CRITICAL EVALUATION OF: "OPHTHALMOMETRY THROUGH THE CORRECTION LENS"*

Julius F. Neumueller, Opt.D.
Haddonfield, N. J.

The March issue of the AMERICAN JOURNAL OF OPTOMETRY carried an article by Drs. Ryer and Hotaling, entitled "Ophthalmometry Through the Correction Lens." In the closing sentence the authors invite scientific tests on the procedure set forth in this article. Before making any tests it is always advisable to examine the premises upon which such tests are based. If theoretic consideration and previous experience should prove these premises to be wrong, the time and effort consumed by succeeding tests can be avoided.

The authors maintain that they can determine, or at least check the total astigmatic error by inserting the tentative correction—cylinder reversed by 90° before the eye and apply the ophthalmometer to this combination of eye and lens. If the ophthalmometric reading thus approximates a "With the Rule" astigmatic error of .50D, the tentative test cylinder is considered to be the total astigmatic error. The residual .50D is regarded as the amount of corneal astigmatism which is neutralized by the physiologic astigmatism.

Now, precisely what effect on the ophthalmometric readings has a test lens when inserted before an eye? The combination of a lens and a convex mirror, such as the cornea, gives again a convex mirror. When the lens is of plus power, then the curvature of the resultant mirror decreases, that is, its radius is larger than that of the actual cornea. When expressed as a single spherical refracting surface, the power of the combination is, therefore, less than that of the actual cornea. The opposite effect is produced when the lens in front of the cornea is of minus power. The resultant convex mirror will then have a shorter radius and its refracting power is higher when measured with the ophthalmometer through the lens. This optical effect is, of course, well known and the general prin-

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cipal is discussed in any standard text book on optics, usually found under the caption, "Thick Mirrors." For many years it has been applied in practice when the curvature of the cornea or the corneal astigmatism is beyond the range of the ophthalmometer. In such cases plus or minus spheres are held before the eye under test and the ophthalmometric reading made through these lenses, gives a good approximation of the corneal astigmatism.

As the rays from the mires are passing through the lens twice, namely on their way to the cornea and then as reflected rays on their return, the distance from cornea to lens greatly effects the end result.

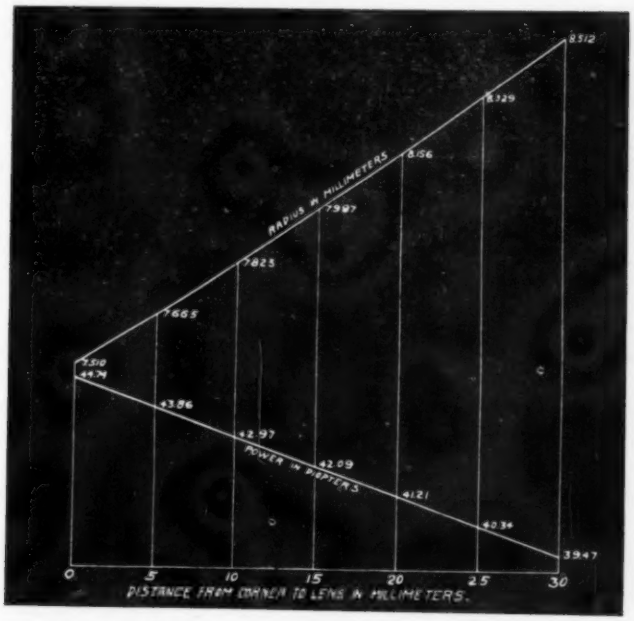


Figure 1—Resultant Ophthalmometric Measurements (C. I. Instrument) of Cornea of 45.40 D. (r=7.4 mm.) Through a Plus 2.00 D. Lens held at Various Distances from the Cornea.

Figure 1 shows the computed ophthalmometric measurements as they will be found with a C. I. ophthalmometer on a cornea of 45.40D and thru a plus 2.00 diopter lens held at various distances from this cornea. A shift of 5 mm. already produces a change of about 1.00 diopter. These computed values check within .2 diopters with the ones found experimentally.

Very simple considerations of this kind might have restrained the

authors from making ophthalmometric readings on ten thousand eyes. The fact that a residual .50D "With the Rule" can be attained in most cases by changing the position of the lens, thus "fitting the foot to the shoe," is no proof of the validity of the test. It simply demonstrates experimentally the great influence of the position of the lens upon the resultant cornea, as presented in Figure 1.

The problem is purely an optical one and can be solved easily and quickly by a very simple computation. The results are without any practical meaning is they do not represent the total effect of ametropia and corneal astigmatism with a residual .50D as allowance for the physiological astigmatism.

The statement by Drs. Ryer and Hotaling, "It (their procedure) was presumed to embody allowances for not only the physiological astigmia and the distance of the lenses from the cornea, but for the spherical ametropic component as well," shows that the authors have totally misunderstood the problem of the correction cylinder. The ametropia is not determined by the curvature of the cornea, nor, as shown above, does the influence of the shift of the lens have the same effect on the resultant cornea as it has on the total correction cylinder.

As the authors refer to my tables* and claim, wrongly, that their procedure is an experimental way of attaining the computed result of these tables, it seems indicated to repeat some of my earlier verbal and published statements.

These tables were computed in order to be able to see clearly the influence of the ametropia and position of the correction lens upon the ophthalmometric readings. A study of these tables and diagrams shall establish in the examiner's mind, a picture how the ophthalmometric reading will tend to be modified in every case. If the cylinder found subjectively runs counter to these modifications, it is a sign that either accommodative or, in isolated cases, interpretative factors are at work besides the well-known optical ones. This knowledge is of high diagnostic value. I never recommended to consult the tables during the clinical test, but only stressed that a few simple considerations be kept in mind. These considerations were published about six years ago as Bulletin No. 9 of the Bureau of Visual Science, American Optical Company.

Summing up, it is found that the assertion by Drs. Ryer and Hotaling, that the ophthalmometric measurement, through the correction lens yields the total correction cylinder, is erroneous. What is measured is a new cornea and the findings bear but little relation to the

ametropic error and the distance of the lens to the eye, the two factors which modify the ophthalmometric reading. Incidentally, even if the procedure were correct, the writer believes it is so involved and clinically cumbersome as to exclude its application.

HADDONFIELD, N. J.

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## EYES OF THE BRITISH AIR FORCE*

In 1916 Group Captain Clements, late of the Central Medical Board of the Royal Flying Corps, started his researches into the reasons why some pilots could make perfect landings every time and others tended to fly into the ground or to "hold off."

In 1919 he was joined by Squadron Leader Livingston, who later himself qualified as a pilot. Thence there developed the present highly scientific but severely practical Ophthalmic Section of the Central Medical Board.

Recently we had the privilege of being shown the latest methods of

*A Special Correspondent from The British Information Services.

testing and training the eyes of those who fly or would fly in the Royal Air Force.

First, we saw the method by which the degree of deviation from the balance of the focusing muscles of the two eyes is measured. Later we were to see how exercises correct any lack of balance.

But, first, Air Commodore Livingston, who is now recognized as amongst the foremost eye-experts, showed me how pilots and air crews are tested for night vision. Over 100,000 personnel have been tested in the last two years. First, the subjects wear close-fitting dark glasses for half an hour in normal light to accustom their eyes to darkness.

Then they enter a dark room and sit, six at a time, in chairs round an electrically controlled hexagon. Steps are taken to prevent any tendency to lean forward to view the objects which ten minutes later appear on the hexagon with no more intensity of light than is available on a dark night. Aided by Braille-like protrusions on charts in their hands, the subjects reproduce what they see in front of them.

Exceptional subjects gain thirty marks or more out of a total of thirty-two, but the average score is in the region of twenty.

It is interesting to note that about eighy per cent of the subjects tested for night vision were successful the first time, fifteen per cent succeeded at a second attempt, and only five per cent failed; a remarkable tribute to the physical fitness of the air crews of the Royal Air Force.

We were then put in charge of an efficient W.A.A.F. officer, one of the thirty-three trained orthoptists assisting the R.A.F., who have done all the night vision tests in this country. Similar tests have been carried out in Gibraltar, Malta, Cairo, South Africa, and Canada. She it was who introduced us to the mysteries of the new electric development of the old amblyoscope, by which my eye muscles were tested and measured for balance and fluidity.

Convergence and fusion and range of accurate binocular movement of the two eyes was tested at the same time, and we must report that whereas twenty years ago the parrot (or was it a cockerel?) showed an uncontrollable desire to depart out of the cage, the emblem now remained stolidly and steadfastly where it should—in the middle of the cage.

By these tests and exercises those pilots, often jaded instructors, or operation-weary, whose eye balance and control have been disturbed by fatigue, so that they either tend to "fly in" or "hold off" their aircraft

when landing — the "esophores" and the "exophores" — are brought back to normal eye health and three-point landings.

The next piece of magic related to stereoscopic vision by which things are seen in perspective, and apples appear round and some objects appear nearer than others. One either has stereoscopic vision or not. Nothing can be done to develop it if one has not got it, but if one has, judgment in the use of it can be trained. The experts who examine the photographs of the results of our bombing of Germany usually possess a finer grade of stereoscopic vision and are assisted in reaching this high grade by the orthoptists in the R.A.F.

And then it was proved to us that whilst we might have quite good stereoscopic vision in our normal upright position, when we banked at 75 degrees—a most ingenious instrument this—we were not so reliable, though our judgment in this respect could be trained.

Indeed, this is the function of this Department, and all that it claims—to train the judgment of the relations of the objective world through the use of data given by the eyes.

From this it was a short step to teaching people "how to look," for aircrews have to look for submarines in all conditions of light and visibility. It is astonishing, I learned, that so much can be learned about "looking" even by alive and alert airmen. This field of activity offers the most fascinating possibilities for the future of intelligence and awareness.

The latest type of Royal Air Force flying-goggles are very light, of unbreakable glass which will stand the blow from a bullet ricochet, and yet give an unexampled wide field of vision. Into these can be introduced corrective lenses.

It is not generally known that subnormal vision does not disqualify for aircrew if it can be corrected by exercises or lenses. Indeed, in certain selected cases pilots are flying successfully using "contact" lenses.

We learned that the W.A.A.F. orthoptists, as they are called, qualified before the war at the Westminster Ophthalmic and other well-known hospitals throughout the country, putting into practice amongst children for the correction of squints the principles which underlie this world pre-eminent eye-service for the Royal Air Force.

But, Air-Commodore Livingston told me, if it had not been for the enthusiastic cooperation of the Flying Branch and personnel this work could not have made the progress it has.

## BOOK NOTICES AND REVIEWS

**Books received are acknowledged by notices in this department. Special selections will be made for more extensive review in the interest of our readers as space permits.**

# EXCERPTS FROM ALDOUS HUXLEY'S NEW BOOK, "THE ART OF SEEING"*

A. Virginia Flatten
Minneapolis, Minnesota

When conditions are favorable, sick organisms tend to recover through their own inherent powers of self-healing. If they do not recover it means either that the case is hopeless, or that the conditions are not favourable—in other words, that the treatment being applied is failing to achieve what an adequate treatment ought to achieve. (p. 15).

If such things can be done for crippled legs, why should it not be possible to do something analogous for defective eyes? To this question the orthodox theory provides no answer—merely takes it for granted that the defective eye is incurable and cannot, in spite of its peculiarly intimate relationship with the psyche, be re-educated towards normality by any process of mind-body co-ordination. (p. 21-22).

The orthodox theory is, on the face of it, so implausible, so intrinsically unlikely to be true, that one can only be astonished that it should be so generally and so unquestionably accepted. Nevertheless, such is the force of habit and authority that we all do accept it. At the present time it is rejected only by those who have personal reasons for knowing it to be untrue. I myself happen to be one of these. By the greatest of good fortune I was one of these. (p. 22).

Dr. Bates discovered that, by means of appropriate techniques, this condition of [eye] strain could be relieved. When it had been relieved—when patients had learnt to use their eyes and mind in a relaxed way—vision was improved and refractive errors tended to correct themselves. (p. 24-25).

By means of these [Bates] techniques large number of men, women

*Huxley presents the Bates Theories in a readable manner. As a layman and one of America's outstanding contemporary authors, his views on ocular subjects are of interest to all optometrists. These few excerpts will give the reader some idea of his treatment of the subject and will no doubt make him wish to add the book to his library. The text is published by Harper & Brothers, Publishers, New York City. $2. 1942.

and children, suffering from visual defects of every kind, have been successfully re-educated into normality or towards normality. (p. 26).

A method [is used] which does not confine itself to the mechanical neutralization of defects but aims at the removal of their physiological and psychological causes. And yet, in spite of the long period during which it has been known, in spite of the quality and quantity of the results obtained through its employment by competent instructors, Dr. Bate's technique still remains unrecognized by the medical and optometrical professions. (p. 26).

The very fact that the method is unrecognized and lies outside the pale of orthodoxy is a sufficient invitation to the petty adventurers and charlatans who hang upon the skirts of society, ever ready and eager to take advantage of human suffering. (p. 27).

But because *some* unorthodox practitioners are charlatans, it does not logically follow that *all* must be. (p. 28).

Another reason for the orthodox attitude in this matter is of a strictly empirical nature. Oculists and optometrists affirm that they have never witnessed the phenomena of self-regulation and cure, described by Bates and his followers. Therefore they conclude that such phenomena never take place. (p. 31).

But this is because they have never had any dealings with patients who had learned to use their organs of vision in a relaxed, unstrained way. (p. 31).

Oculists and optometrists will observe the phenomena described by Bates as soon as they begin to relieve the strain in their patients' eyes by means of Bate's method of visual education. (p. 31).

To this empirical reason for rejecting the Batesian technique must be added one more—this time in the realm of theory. In the course of his practice as an oculist, Dr. Bates came to doubt the truth of the currently accepted hypothesis regarding the eye's power of accommodation to near and distant vision. (p. 32).

Whether Dr. Bates was right or wrong in his rejection of the Helmholtz theory of accommodation, I [Huxley] am entirely unqualified to say. (p. 33).

The art of seeing is like the other fundamental or primary psychophysical skills, such as talking, walking and using the hands. (p. 35).

It takes apparently several years for adequate seeing habits to be formed. (p. 35).

But whereas it takes a very serious mental or physical shock to break down the automatic habit of talking or walking correctly, the habit of using the seeing organs as they should be used can be lost as the result of relatively trivial disturbances. Habits of correct use are replaced by habits of incorrect use; Vision suffers, and in some cases the mal-functioning contributes to the appearance of diseases and chronic organic defects of the eyes. (p. 35-36).

The technique of the process of re-education has been worked out by Dr. Bates and his followers. (p. 36).

The Bates Method is based upon precisely the same principles as those which underlie every successful system ever devised for the teaching of psycho-physical skill. (p. 36).

Learn to combine relaxation with activity; learn to do what you have to do without strain; work hard, but never under tension. (p. 37).

To speak of combining activity with relaxation may seem paradoxical; but in fact it is not. For relaxation is of two kinds, passive and dynamic. Passive relaxation is achieved in a state of complete repose, by a process of consciously "letting go." (p. 37).

Dynamic relaxation is that state of the body and mind which is associated with normal and natural functioning. In the case of what I [Huxley] have called the fundamental or primary psycho-physical skills, normal and natural functioning of the organs involved may sometimes be lost. But having been lost, it may subsequently be consciously re-acquired by anyone who has learnt the suitable techniques. When it has been re-acquired, the strain associated with impaired functioning disappears and the organs involved do their work in a condition of dynamic relaxation. (p. 37-38).

Sensing is not the same as perceiving. The eyes and nervous system do the sensing, the mind does the perceiving. The faculty of perceiving is related to the individual's accumulated experiences, in other words to memory. Clear seeing is the product of accurate sensing and correct perceiving. Any improvement in the power of perceiving tends to be accompanied by an improvement in the power to sensing and of that product of sensing and perceiving which is seeing. (p. 49).

In the orthodox treatment of defective vision attention is paid to only one element in the total process of seeing, namely the physiological mechanism of the sensing apparatus. Perception and the capacity to remember, upon which perception depends, are completely ignored. (p. 50).

It is highly significant fact that, in Dr. Bates' method for re-educating sufferers from defective vision, these mental elements in the total process of seeing are not neglected. On the contrary, many of his most valuable techniques are directed specifically to the improvement of perception and of that necessary condition of perception, memory. (p. 51).

The first and most significant fact is that sensing, selecting and perceiving cannot take place without some degree of bodily movement. (p. 69).

Relaxation, as we have seen, is of two kinds, passive and dynamic. The art of seeing includes techniques for producing either kind—passive relaxation of the visual organs during periods of rest, and dynamic relaxation, through normal and natural functioning in times of activity. Where the organs of vision are concerned, complete passive relaxation can be achieved, but is less beneficial than a mixed state, combining elements of both kinds of relaxation. (p. 82).

The most important of these techniques of (predominantly) passive relaxation is the process which Dr. Bates called "palming." In palming the eyes are closed and covered with the palms of the hands. In this way light can be completely excluded from the eyes, even though the eyeballs remain untouched. (p. 82-83).

When the eyes are closed and all light has been excluded by the hands, people with relaxed organs of vision find their sense-field uniformly filled with blackness. (p. 83).

Towards the ends of his life, Dr. Bates modified his procedure in this matter, and the most successful of his followers have done the same. The person who palms his eyes is no longer told to imagine blackness, but to occupy his mind by remembering pleasant scenes and incidents out of his personal history. After a period more or less long, according to the intensity of the strain involved, the field of vision will be found to be uniformly black. (p. 84).

Palming, on the contrary, keeps the mental powers of attention and perception at work in the effortless, freely shifting way which is natural to them, at the same time as it rests the eyes. (p. 86).

Be this as it may, the results of palming are remarkable. Fatigue is rapidly relieved; and when the eyes are uncovered, vision is often noticeably improved, at any rate for a time. (p. 87).

Blinking has two main functions; to lubricate and cleanse the eyes with tears; and rest them by periodically excluding light. (p. 91).

Movement, as the psychologists have long been insisting, is one of

the indispensable condition of sensing and perceiving. But so long as the eyelids are kept tense and relatively immobile, the eyes themselves will remain tense and relatively immobile. Consequently, anyone who wishes to acquire the art of seeing well must cultivate the habit of frequent and effortless blinking. (p. 92).

This can be done by pausing every now and then to perform a brief blinking-drill—half a dozen light butterfly-wing blinks; then a few seconds of relaxed closure of the lids; then more blinks, and another closing. And so on for half a minute or a minute. Repeated at frequent intervals (say, every hour or so) these drills will help to build up the habit of frequent blinking during the rest of the day. A person who has become "blink-conscious" will also be conscious of his own tendancies to immobilize the eyes and lids, and will be able to check the incipient start by frequent and easy closures of the lids. Frequently blinking is especially important for those engaged in any form of difficult and detailed work, requiring close attention. (p. 93).

Massage of the eyes themselves is always undesirable; but a gentle rubbing of the temples will often be found soothing and refreshing. Eye fatigue may also be relieved by rubbing and kneading the muscles of the upper part of the nape of the neck. (p. 94).

Experimental psychologists have noted a fairly regular correlation between the state of attentiveness and a modification of the normal rate and amplitude of breathing. (p. 95).

Relaxation and proper breathing will bring about an improvement in circulation, safely and naturally and by methods which are entirely under the control of the person employing them. Moreover, the resulting improvement in visual functioning and in the organic condition of the eyes will be the same, whichever means of increasing circulation are employed. (p. 98-99).

The eyes do their work most easily and efficiently when they are allowed to alternate between good solid darkness and good bright light. (p. 101).

Acquiring normal reactions to light is one of the essential procedures in the art of seeing. Appropriate drill in connection with sunlight will produce a valuable kind of passive relaxation. (p. 106).

To avoid internal staring and the possibility of too prolonged an exposure to the light of any given portion of the retina, move the head gently but fairly rapidly from side to side. A lateral swing of a few

inches will be quite sufficient, so long as it is kept up continuously. (p. 107-108).

After a very little while most people will find that they can, without discomfort, take the sunlight upon the open eyes. The most satisfactory procedure is as follows: Cover one eye with the palm of the hand, and, taking care to swing the head from side to side as before, allow the other eye to travel back and forth three or four times across the sun, blinking rapidly, lightly and easily as you do so. Then cover the eye that has been exposed to the sunlight and repeat the same process with the other eye. Alternate for a minute or so; then palm until the after-image disappears. When the eyes are uncovered, it will generally be found that vision has distinctly improved, while the organs feel relaxed and suffused with warm sense of well-being. (p. 108-109).

Those who wish to sun both eyes simultaneously, may do so in moderation without any fear of harm. (p. 109).

Certain procedures are designed to encourage mobility in the defective organs of vision. (p. 115).

The various procedures, to which Dr. Bates gave the name of "swinging," are primarily designed to make the person who practices them aware of this apparent movement of external objects and, by this means, to encourage a condition of free mobility in the sensing apparatus and the controlling mind. Where such mobility exists, psychological and ocular tensions are relaxed, staring is replaced by rapidly shifting central fixation, and there is a marked improvement in vision. (p. 126).

The Short Swing should be performed while standing in front of a window, or in a doorway, or anywhere else where one can arrange to look past some near-by object at some more distant object. For example, the upright bar of a window frame may serve as the near-by object, while a tree or part of a house on the other side of the street will serve as a more distant object. (p. 126-127).

Standing with the feet about eighteen inches apart, one should swing the body, regularly, gently and not too rapidly, from side to side, throwing the weight on to each foot alternating. The swing should not be wide—less than a foot in all is quite sufficient—and the head should not be turned in relation to the shoulders, but should remain looking straight ahead, moving in unison with the trunk. As one swings to the right, the near-by object (say the window bar) will appear to move to the left, across the more distant object. As one swings to the left, it will appear to move to the right. This apparent movement should be noted

during a number of swings; then the eyes should be closed. Still swinging from side to side, visualize the apparent movement of the window bar across the tree at the end of the garden on the house across the street. Then open again and, during a few more swings, watch the real bar as it moves back and forth. Close again and visualize. And so on for a minute or two or longer. (p. 127-128).

This procedure has several advantages. It makes the mind aware of movement. It helps to break the defective eye's bad habit of staring. It produces automatically a shifting of attention and of the *fovea centralis*. All these contribute directly to the dynamic relaxation of the organs of seeing. (p. 128).

Swinging is of fundamental importance in the re-establishment of normal visual functioning, and should be practiced as much as possible. (p. 131).

The procedure which Dr. Bates called "flashing" is important for what it does to foster mobility, and to increase the powers of the perceiving and interpreting mind. (p. 139).

Flashing may be described as the antithesis of staring. Instead of fixing the object with one's regard, instead of immobilizing eyes and mind, and straining to see all parts of it equally well at the same time, one glances quickly at it (flashes it) then closes the eyes and remembers what has been sensed. (p. 139).

After a little practice in flashing, one makes the interesting discovery that the sensing-apparatus takes in a good deal more than the perceiving mind is aware of—especially when the perceiving. (p. 139).

Casual flashing should be supplemented by drills during periods specifically set aside for the purpose. (p. 147).

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## SPECIAL REPORTS

### OPTOMETRIC PUBLIC RELATIONS*

Ewing Adams, Opt.D.
Detroit, Mich.

The President and the Trustees of the American Optometric Association have been given a clear mandate by the membership to engage in

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an extensive and an intensive program of public relations.

In determining the course of the public relations program, the Trustees in conjunction with the public relations counsel have set forth four main objectives for its program. These objectives are, in order:

1. To bring fact and point of view about the scope and function of optometry to those group leaders and opinion molders who influence public opinion and public activities, so that the public may have a true understanding of optometry's place in eye health care. This includes all channels of communication—press, radio, etc., and heads of education, labor, industry and other professions.

2. To bring fact and point of view about public desires and demands to optometry, so that it may maintain and strengthen its position with the public by following public demands in its attitudes and activities.

3. To work equally with all their contemporaries in industry, labor, education and public health, with whom there is a coincidence of interest.

4. To aid in every way the Professional Advancement Program and its

   a. Office of Ethics and Economics
   b. Office of Organizational Advancement
   c. Office of Student Procurement
   d. Office of Public Relations

to help accomplish objectives 1 and 2.

In order to carry through these objectives, there was agreement on three major themes which we are seeking to bring to the attention of the public. These themes are as follows:

1. The serving of the public's interest.

   Eye health care of the individual is our primary consideration. In time of war, optometry has a specialized skill which is needed by the armed forces and industrial workers as two of the most important groups.

   In time of peace as well as war, optometry serves the nation by giving aid to, and bringing relief from visual defects and providing visual training to school children, to civilian workers in all capacities, in relation to highway and industrial safety, and to the indigent through clinics and government projects.

2. Optometry is a profession.

It has definition, scope and functions within itself. It is carefully delineated by law and in practice. Its educational standards are high and based on training for the rendering of a necessary public service. It has assumed the obligations of a public health profession, in providing for the unfortunate and the indigent through the establishment of clinics and cooperation with state welfare and federal programs. It has a Code of Ethics which practitioners must adhere to. It has policing power through yearly licensing by official state boards. It has a background of precedent for service and has contributed greatly to the sum knowledge in its field through research and scientific developments.

3. Optometry has played an important role in the development of special techniques.

   This is true in the fields of visual training, rehabilitation, myopia control, contact lenses, subnormal devices and other similar fields.

The program is predicated on the fundamental principle of reaching the group leaders and molders of public opinion in American life who represent professions, organizations, readers, listeners, students and prospective students, employees and employer groups, service clubs and educators who compose the greatest part of our population.

Many thousands of these people are already being reached through such methods as direct mail, through personal contact and through printed matter.

The public relations campaign is based on intricate timing so that each action is part of the whole.

Included in our plans is the publication of folders and brochures, the preparation of feature stories for newspapers and magazines, the preparation of radio scripts, lecture outlines and similar material. This is now well under way.

Public relations can bring the public a positive picture of optometric accomplishments. It is up to the individual practitioner to sustain that opinion and to demonstrate by his professional proficiency and ethical conduct that we are bringing the public a true picture. The situation insofar as optometry is concerned nationally is most promising. With the success of the public relations program we can all look forward to further gains and accomplishments and to a bright future for the profession.

# OPTOMETRIC PROFESSIONAL ECONOMICS*

JAMES A. PALMER, Opt.D.
Charlotte, N. C.

Quoted in "Ethics and Economics," Part 1, was the definition of a profession as follows:

"A profession has for its prime object the service it can render to humanity; reward or financial gain should be a subordinate consideration."

Service, as our major responsibility, is rendered completely when we look toward the end result. There can be no middle ground. Optometrists recognize that their professional responsibility must be met and discharged completely. Then the economics of the situation need consideration.

Economics for the professional man can be sound and well accepted by the public only when adequate professional income results from professional services rendered. Today the science of refraction, starting as it did closely allied with the sale of glasses of such, approaches its economic problems amidst great confusion. That confusion has spread to the public. Unethical practices have developed and still exist. Commercialism has grown strong and challenges the economics of the ophthalmic professions—of optometry. The sale of spectacles as such has made ophthalmic materials — their costs and prices — criteria to be carefully considered by optometrists in connection with total incomes, net incomes, "profits," taxes and service to be rendered.

Professional men know they must render the services which the public requires. On the other hand, if they render services for which they are inadequately remunerated, the inexorable laws of economics will catch up with them. Then they must altar either their economics or their services to the public. Professional responsibility may become secondary rather than primary.

The interests of the public and of the individual practitioner demand sound professional economics. In fact, ethics and economics go hand in hand where successful professional results are to be attained. In a professional capacity, the optometrist's income must be derived from professional services rendered, rather than from the sale of ophthalmic

*An abridgment of the material presented in Part 2, "Ethics and Economics" of the Professional Advancement Program of the American Optometric Association.

materials in any way, shape or form. There must be no confusion on that point.

Differentiating "consumers" in this field may be difficult. Optometrists are consumers of ophthalmic materials. Hold in one hand a pair of corrective spectacles—the finest example of optical skill. Hold in the other hand a pair of fine sun glasses, such as are sold commercially. Superficially they appear much alike. It is difficult to realize that in one case the consumer was the optometrist who, as a result of examining, refracting and prescribing, utilize certain ophthalmic materials, specifically selected and accurately adapted, to meet an individual's visual needs, and those alone. Separate the therapeutic agent from the individual and it is relatively valueless. In professionally serving his patient's needs, the optometrist was the consumer of the ophthalmic materials used to form that therapeutic agent.

On the other hand, the pair of sun glasses manufactured on a production basis may have characteristics well suited to the needs of any number of people, retaining its value, as any other commodity may retain value, during its usefulness. The consumer, in that case, becomes the individual who finally uses up, by breakage or otherwise, the commodity and its remaining value.

Optometrists must consider themselves consumers of ophthalmic materials if this, our study of Ethics and Economics, is to become real and useful.

Optometrists must realize that a pair of lenses, no matter how simple or how complicated, carry no greater value to a patient than that which was placed in them for the benefit of that specific patient. On this premise we begin to make professional progress. For example, a patient has little or no accurate conception of the relative values of a plus .25 sphere or a complicated bifocal, except when the optometrist incorrectly dwells on the ophthalmic materials instead of on the ophthalmic services involved.

Examining, refracting and prescribing, when completed, make it possible for the optometrist to acquaint his patient with what he is going to do, state what that will mean to the patient in his daily activities, and place a value upon that service. Thus he and the patient receive greater reward and avoid misconceptions.

True concepts of ophthalmic materials, as consumed through the medium of professional services rendered, will clear the way for optome-

trists everywhere. Now, practicing indiscriminately or otherwise, they may aspire to a more professional position—sound from an ethical standpoint—sound from the standpoint of factual economics.

Optometry is young, but has come a long way. Optometrists are scattered through a wide range of practices from the most questionable commercialized rackets to those who, with high professional standards and sound economic concepts, are serving the public with approval as they meet their professional responsibilities. But those who present an indiscriminate, unprofessional picture of optometry are still far too many and optometry thereby suffers from the need of greater and more complete public approval.

The purpose of the Office of Ethics and Economics is certainly not to indict. That has been done fairly well through the years and will need to be done as long as there are optometrists in error. Our job in the Office of Ethics and Economics is to point the way—to lead all who will follow—toward the desired concept of Ethics and Economics.

Optometric problems offer a challenge which might well attract the attention of optometrists right where they are, and give them an opportunity to make the step by step changes which eventually will elevate their position.

Start with the concept of spectacles sold for profit. Optometry operating on a profit basis is thus affected and suffers from a serious misconception by the public. But it doesn't end there. The public's misconception obliterates the true values in eye care. Certainly, in that concept, the difference between the amount charged the "customer" and the actual cost of the ophthalmic materials is presumed by all to be profit. We do know that the profits often seem large. Services sometimes are offered "free."

Unscrupulously, and using less than the best, ophthalmic materials are made available at cut prices and by blatant advertisement. Price battles occur. Spectacles are offered at bait prices, and many optometrists grow uncertain and confused. Under the strong urge of economic savings, the public flocks to the baiters in great numbers and, by expert commercial conniving, spectacles are sold at higher prices—prices that closely approximate or exceed the economic requirements of the ophthalmic field.

Some optometrists may try to compete with these lowered prices by reducing quality and costs of materials. If, under the pressure of competition, the optometrist does this, he reduces his net income—the

amount incorrectly called "profit." When depending on the mark-up system to secure the necessary income for services, the cost of materials is important. Lower the cost of materials and you lower the income required to pay for services. But the services rendered and the cost of rendering them remain the same, and they have not been paid for.

"Selling glasses" offers a fertile field for the unscrupulous. They may try to add to an extraordinarily good profit on materials by reducing their quality, with no lowered charge to the public. Certainly sound economics will never result from such practices. Scrupulous and unscrupulous grow more widely separated and the day always comes when the public learns the truth. Indeed, that day has arrived.

Unsound economics are apparent everywhere that glasses are "sold." Suppose the optometrist who "sells glasses" divides his charge to cover the lenses on the one hand and the frame or mounting on the other. Then should the patient decide to use his own frame, the optometrist has lost a large part of his fee. Regardless of whose frame is used, the services required are the same. Only the laboratory cost of the frame has been eliminated. Or suppose, instead that a patient comes in for a new frame only, using the lenses which he has. More is involved than the cost of the frames. Since the subsequent services of verifying, fitting and servicing are necessary, the optometrist is entitled to a professional fee. Confused thinking in these matters leads to commercial rather than professional practices.

Economists, studying optometry's problem, draw attention to another element of expense, in addition to the cost of materials—and "overhead" or, better, an operating expense. All professions have an operating expense. Thus part of what previously seemed to be a large profit is explained.

Idealists, studying optometry's problem, recognized that the true values in eye care—the professional services rendered by optometrists—made of it a profession. They pointed out the need for naming an examination fee. It was as if naming an examination fee would correct the situation and make the optometrist a professional man.

Examination fees are usually relatively small. Stating an examination fee to indicate a profession and at the same time continuing to sell glasses at a profit is absurd. Due to this confusion on the part of the optometrist, he presents a confused picture resulting in the public's misconception of the true values in eye care.

The public's misconception concerning eye care services has grown

and continues to grow. Public and private attacks are made on the profession of optometry. We must stop and organize our thinking so that effective steps may be taken by every optometrist to correct this incongruous picture.

Our job is to direct the organized thinking of optometrists specifically to the services they are actually rendering, of which they must inform the public—their patients—and for which they must be paid. For in that way and that way only can the misconception be corrected. Truth will make us free. Let us tabulate professional services rendered by optometrists in their capacity as refractionists.

Six professional services may be established as follows:

1. *Examining to determine the presence or absence of pathology.*
2. *Refracting and visual analysis. (Determine the procedure to be followed to re-establish visual efficiency and eye comfort.)*
3. *Writing a prescription for glasses.*
4. *Consumption of the prescription materials.*
5. *Verifying and fitting; and re-evaluation.*
6. *Services essential to professional eye care for the life of the materials.*

Today all of the foregoing represent for optometrists a "complete optometric service." This paper does not deal with visual training. Later we will be able better to consider the economics of the subject.

Certainly we may conclude that the entire services are not rendered at less expense than the old "business of selling glasses" was conducted. It is not expected that they should be. To the contrary! Instead, and importantly, operating expense is always spread over services rendered. Thus it is that fees for professional services are sometimes criticized as being high, particularly when they are viewed commercially.

Remember that as long as the prerogative of choice remains with the public there will be little complaint about the size of professional fees. Inevitably the public determines the size of the professional fees it pays. We in no way imply any change in the amount of fees to the patient. That is most certainly not the job of the Office of Ethics and Economics. The size of your professional fees must always remain the same as the length of your legs. Both must reach solid ground.

Everything said here could be repeated with your total charge or

fee to the patient remaining as at present. We are considering only the misconceptions which grow out of unsound practices and the thinking which is necessary to lead us into a planned and factual economy for optometry as a profession. Through the services which he renders the public, every optometrist must insure for himself an adequate annual income. Fees for services rendered must replace the "price of glasses" in the thinking of optometrists and of the public. Usually ophthalmic materials are consumed and enter, along with rent and other expenses, into the calculation of the fee.

The materials consumed can easily be estimated by a study of past performances over any given period of time—5 years, 3 years, or whatever. It is readily seen that this figure may vary from year to year. Add the cost of ophthalmic materials consumed to the operating expenses of any practice under consideration, plus the annual income desired by the optometrists, and the gross income established.

We now arrive at the basic fee of this further step. Study the records for whatever time is available, consider the economic status objectively, then divide the gross income by the total number of patients handled. The answer is the basic fee.

Transitional periods are difficult. While we are going up the economic ladder in optometry's struggle for higher standards or ethics and sound economics, we must expect many problems. Keep the basic fee in mind, however, and remember that the experiences of past years may well be repeated. We may have cases which result in a greater income than is indicated by the basic fee. Also, we may expect to have cases lower than the basic fee. Thus was the basic fee established.

One thing is certain. We must not expect our national officers, economic specialists, fellow optometrists, industrial executives, or anyone else to dictate the fee any one of us is to charge for any professional service. To do so would be unsound and impractical. It must not be expected or accepted. Furthermore, we as individuals should not seek or give such answers. It will be unintelligent for the profession, the industry, or any member of either to state fees for services rendered, except as an individual sees fit publicly to disclose his own fees for services rendered. This any individual has a perfect right to do. Even then, the question of discretion is obvious. In other words, in our desire for healthier economics, we must not grow impatient and expect to gain health by unhealthy methods.

First let us review the variables which may alter any average fee—

variables that are sound and will meet with public approval.

*Factor No. 1,* is stated as follows:

> "The type and character of the Optometrist charging the fee."

All members of any professional group need not, of necessity, charge the same fees for the same services. Each individual establishes the fee for his own services, knowing that the public finally checks it. As a result of this unimpeachable fact, we have in all professions a scale of fees ranging from the lowest to the highest. The same must prevail in the ranks of optometry, as a profession.

Individual optometrists determine their own fee levels, and we can have no criticism of the value they thus place upon their services. We should, however, encourage and foster their desire to render a more complete and valuable service, which of itself will create a better income.

*Factor No. 2* is stated as follows:

> "The character of the service and the skill and knowledge involved in rendering the service."

Here again each optometrist has the right to decide where to place the emphasis on his own work. In other words, it is perfectly possible for one practitioner to feel that by far the major value of his service lies in the examining, refracting, and prescribing. He may ask a fee of any size for those services, have it approved, accepted and paid for by the public, and succeed thereby. In our present stage of professional development it may be possible for another individual to place greater value upon after care than upon examining, refracting, and prescribing. These represent two extremes but accurately picture the flexibility which is inherent and must remain so in the matter of professional fees.

One optometrist may consider that a bifocal case demands greater skill and knowledge than a single vision case. If so he is justified in adjusting his fees accordingly. Other optometrists may consider the end results and decide that certain complicated single vision cases require greater skill and knowledge than certain bifocal cases. By the same standards, their fees may be established.

*Factor No. 3* is stated as follows.

> "The value of the service to the patient and ability to pay."

The value of the services to the patient may importantly change Factor No. 2. Give due consideration to the influence of "value to the patient" in connection with "the character of the service and the skill and knowl-

edge involved in rendering the service," and you have a further important meaning to Factor No. 3—its social implications.

Optometric service is essential to the continued progress of civilized man and optometric professional services must be available to all income levels of society. It is the responsibility of the professional optometrist to see to it that the underprivileged of his community are given the same consideration in visual welfare as the privileged.

Irrespective of the basic fee of any practitioner, there are occasions when his best complete service must be administered to individuals from whom he cannot expect adequate fees. On occasion, they must be less. Sometimes there may be no fee. Professional pride and integrity demand that all individuals receive the same service as though they had paid adequate fees.

Important, and in addition to all that has been said, is the necessity for optometrists to consider the six services mentioned earlier in this paper—examining, refracting, prescribing, the consumption of the prescription materials, verifying and fitting, re-evaluating and servicing. Each and all are essential and must be integrated if the best interest of the patient is to be served.

Transition is change. But change may be demanded of us without transitional steps. When that is the case, several things occur. Misunderstanding, resentment, and failure are the lot of those unable to make radical changes, and they may remain behind and sabotage the effort to advance.

"Ethics and Economics," Part 1, says:

> "Survey figures indicate that the life of a pair of spectacles is about four years, during which time they should be serviced repeatedly. The continued tightening, straightening, and refitting the frames to the patient's needs has long been established in the public's mind as a complimentary service. The original idea of pioneers of years ago was that it was good practice as a courtesy that would attract patients. The idea is not compatible with good eithics or economics. We should begin to condition the public mind that such services are valuable and that a reasonable fee must be made for this service."

Actually, nothing we do can be without charge, any more than any of the services we receive ourselves are without charge. Either we have paid for them in the original charge or thereafter in some manner.

Only by understanding this can the public understand the value of services rendered. In that way and in that way only can the "services free" of commercialized rackets be measured and found wanting.

Facing facts frankly, we may make our change from faulty to factual economics by transitional methods—ladder-like—so that step by step our thinking may be changed and elevated.

Consider the six services already mentioned. By natural, universally understood combinations indicated below, we can set up four service units to use in determining equitable fees for various services rendered.

Service Unit A—Examining, refracting, and prescribing

Service Unit B—Consumption of ophthalmic materials

Service Unit C—Verifying and fitting—and re-evaluation

Service Unit D—Subsequent servicing

Some optometrists perform all these service units, for which they charge one fee. However, some patients may prefer to discontinue after Service Unit A. In such case the optometrists must be prepared to charge accordingly.

Other optometrists engage in Service Unit A only, delegate the remaining units to others, and require only an opportunity to control the case satisfactorily by verifying the prescription and re-evaluating it at a subsequent date (actually part of service unit C).

Just as we indicate a difference in approach to professional services on the part of optometrists, so we must remember that the same differences apply to the ophthalmologists. Anything we do in the field of optometric economics will be more favorably judged by the public if sound conformity is found in the economic behavior of all three ophthalmic groups. Sound conformity on the part of the three ophthalmic groups would tend to engender a greater spirit of cooperation, which would result in less confusion and misconception concerning ophthalmic services.

## TRANSACTIONS OF THE AMERICAN ACADEMY OF OPTOMETRY

by J. Fred Andreae, Secretary

A department devoted to announcements, reports, appointments, organization data, news, professional problems and ideals, as these relate to the Academy.

## PHILADELPHIA CHAPTER SERVES NAVY YARD EMPLOYEES *

It has been noted that many Navy Yard workers, who must wear glasses, fail to wear the protective goggles with which they have been supplied. They claim that the combined weight of the spectacles plus the goggles makes them uncomfortable, or that the goggles throw their glasses out of adjustment, etc.

That these complaints are frequently justified is recognized—however, eye protection is of paramount importance; eye injuries can and must be prevented and the only way this can be accomplished is by the wearing of protective goggles.

Those workers who require glasses can have their prescription ground into the lenses of protective goggles thus doing away with the need of glasses plus goggles. Such prescription goggles are considerably lighter and are more comfortable to wear than ordinary goggles because they are designed and fitted to the individual needs of the person who is to wear them. Modern design has made prescription safety goggles good looking and as comfortable to wear as your regular glasses.

In line with our policy of affording the greatest possible protection to our workers and as a result of many requests by employees, arrangements have been made with the Philadelphia Chapter of the Academy of Optometry of Pennsylvania whereby Navy Yard Workers may obtain prescription safety goggles at cost plus a nominal service charge. Your picture badge is the only identification required to obtain this service. The eye specialists (Optometrists) who are members of the Academy have been certified by state board examination as well as by the Academy. They have also made a special study of the prescribing and fitting of prescription safety goggles.

The doctors who have agreed to render this service are doing so as a patriotic gesture to help stimulate our vital war production by elim-

* From the Pennsylvania Optometrist, Vol. 3, No. 1, p. 17.

inating painful and time consuming eye injuries. Prescription safety goggles may be obtained from them either by having the prescription in your present glasses copied, or if your present glasses need changing, they can examine your eyes and provide you with goggles made to your new prescription. (A fee will be charged for this latter service.)

An alphabetical and geographical directory containing the names and addresses of the members of the Academy is available. If you are interested in protecting your eyes with a pair of prescription goggles, you can obtain a copy of this directory from your Shop Clerk.[1]

[1] Copy of article published in the newspaper of the United States Navy Yard, Philadelphia, Pa.

## ANNOUNCEMENTS

### ANNUAL MEETING OF A. O. A.

July 11-14, 1943, are the dates set by the Board of Trustees for the 46th annual meeting of the House of Delegates of the American Optometric Association. The Morrison Hotel at Chicago was chosen as headquarters, and all of the meetings will be held in the Terrace Casino.

Because the administration, in an effort to prevent overcrowding of public services, such as transportation, hotel facilities, etc., has asked that meetings of this nature be held to a minimum, the Board of Trustees voted to hold a meeting of the House of Delegates only. There will be no exhibits, no educational lectures and no entertainment, except that which might be provided informally and arranged for by the local committee in charge, after the registrations are in. A Fellowship Dinner will take the place of the regular banquet, and will be held on Tuesday evening.

Registration will begin on Sunday morning.

President Adams has asked that a full and detailed report of each department or committee be submitted in writing to the secretary. A synopsis of the report is to be rendered by the chairman or representative of the department or committee. Delegates from every state are expected to attend.

## ANNUAL MEETING OF BETA SIGMA KAPPA

Dr. Harry E. Pine, president of the International Honorary Fraternity, Beta Sigma Kappa, has announced that the annual meeting of Beta Sigma Kappa will be held at the Morrison Hotel, Chicago, Illinois, on July 13th at 12 noon, this in conjunction with the convention of the American Optometric Association.

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## LITERARY PRIZES FOR THOSE IN ARMED FORCES BY MACMILLAN*

To celebrate its Centenary in 1943, the firm of Macmillan, with headquarters in New York, London, Toronto, and branches in Boston, Chicago, San Francisco, Dallas, Atlanta, Bombay, Calcutta, Madras, and Melbourne, announces The Macmillan Centenary Awards: An Opportunity for Those in the Armed Forces.

In the announcement of this, the first general prize contest in their history, the publishers say: "In the Armed Forces of the United Nations, there are unquestionably many persons, who, but for the war, would be following writing careers. Many of them are undoubtedly even now planning books for the future and have possibly completed or embarked upon some part of their work. To encourage them and all others in the fighting forces of the United Nations is the aim of these Awards."

The American awards consist of $2,500 for the best novel and $2,500 for the best work of nonfiction. There will also be smaller awards, totaling $5,000, for other manuscripts or publishing proposals. All awards are outright payments and are in addition to the author's regular royalties. In the event of a tie, the full amount of the award will be paid to each author.

The British award consists of £500 for the best novel and £500 for the best work of nonfiction (plus smaller awards totaling £1,000). These awards, as in the case of the American awards, are outright payments and in addition to the author's regular royalties. (Canadians are requested to send in two copies of their manuscripts or summaries).

A special Canadian award of £500 for the best Canadian entry in the event of its not winning a major award is also included.

Special qualifications for the American awards: 1) A contestant must be either an American citizen serving in a branch of the Armed Forces of any of the United Nations, or anyone, citizen or otherwise, serving in a branch of the Armed Forces of the United States.

Special qualifications for the British awards: A contestant must be a British-born man or woman serving in any branch of the Armed or Auxiliary Forces of the British Empire.

The terms of the contest limit the contestants, men and women, to the age range of 19 to 35 (inclusive). All manuscripts must be in English. A contestant may submit a completed but unpublished manuscript, or a partly written manuscript together with an explanation or synopsis of how it is to be completed.

All manuscripts must reach the publishers before December 31, 1943, unless it can be shown that the delay in submission is due to the conditions of the war.

Proposals or material for technical, specialized, or purely educational books are outside the field of these awards.

All prize books will be published in the United States, England, and Canada, for distribution throughout the world "wherever English books are read."

All awards are contingent on the signing of a formal contract, by the nominee for the award, for the publication of the work concerned. On any manuscript submitted, whether complete or in outline, the author must give the Macmillan Company in the United States or Macmillan & Co., Ltd., in London or Toronto, an exclusive option for six months from the date on which it is received.

The decision of The Macmillan Company in New York or of Macmillan & Company, Ltd., or of The Macmillan Company of Canada, Ltd. (as the case may be), must be considered final on all matters.

Submission of manuscripts for the American awards should be made to—

The Macmillan Company, 60 Fifth Avenue, New York.

Submission of manuscripts for the British awards should be made to—

Macmillan & Company, Ltd., St. Martin's Street, London, W. C. 2.

The history of the house of Macmillan goes back to 1843 when two brothers, Alexander and Daniel Macmillan, opened a bookshop in Aldersgate Lane, London. From this shop their first books, largely theological or educational in nature, were published. In 1857, with the publication of Charles Kingley's "Westward Ho!" they had their first

great success in belles lettres. Other literary landmarks in the early days of the London firm were "Water-Babies," "Alice in Wonderland," "Tom Brown's Schooldays," "A Book of Golden Deeds," and "The Golden Treasury."

The American firm of Macmillan had its origin just after the Civil War when an American agency for the Macmillans was established in a private residence in Bleecker Street, New York City, under the management of George Edward Brett. On his death, his son, George Platt Brett, assumed the management. Then, in 1896, on the death of Alexander Macmillan, two distinct companies were organized, Macmillan & Co., Ltd., of London, and The Macmillan Company of New York, with Mr. Brett as president of the American corporation. In 1931, George Platt Brett, Jr., became president of the company and Mr. Brett, Sr., took the position of Chairman of the Board, which he held until his death in 1936.

Although the English and American firms are managed separately, a close cooperation exists between them, English titles of interest to Americans being published here by the American firm, New York publications of interest in England being issued there by the London house.

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## ABSTRACTS

A department in which will appear abstracts of the literature of optometry, ophthalmology and applied optics. These will be classified according to the following list, although contributions to all sections will not necessarily appear in each issue.

1. Ocular Refraction.
2. Physiological Optics and Color Vision.
3. Ocular Muscles.
4. Orthoptics and Reading.
5. Anatomy, Histology and Embryology.
6. Ocular and General Pathology.
7. Ophthalmic Lenses and Material.
8. Instruments.
9. Hygiene and Illumination.
10. Applied and Physical Optics.
11. Education, Sociology and Economics.
12. Miscellaneous.

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### 4. ORTHOPTICS AND READING

#### ORTHOPTIC TRAINING. H. Ward Ewalt, Jr. Pennsylvania Optometrist, 1942, 3, 1, 3-8.

"We must think of ourselves as teachers when we do visual training. We are teaching visual skill. What are some of these principles of education that we must apply to this orthoptic job if we are going to get good results? The first principle is that we must 'learn the patient,' in the same sense that a teacher must know her students. I mean by that,

that we must know what the needs of a particular individual are. We must understand his personality, we must know his likes and dislikes and his hobbies. The more we know about our patient the better job we can do for him. In all of our contacts with him determine how we can motivate him. We must develop in that patient a confidence in himself and in us and in the importance of the job that we are going to do.

"Orthoptic training is not a matter of instrumentation. I think we are all convinced by this time that we are not doing muscle work. Successful orthoptic training is a matter of knowledge, it is a matter of understanding the principles involved. If I could choose between a practitioner who knew his orthoptics and who had no instruments, that is, no orthoptic instruments, and a man who had every orthoptic instrument that was ever made and knew nothing about orthoptic training, I would unquestionably choose to have the orthoptic training done by the man who knows orthoptic training. Adequate instrumentation is valuable and very convenient and it has a place, but it isn't a necessity."—G. L. DuP.

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9. HYGIENE AND ILLUMINATION

EYE PROTECTION IN MINING OPERATIONS. Seip, R. H. Sight-Saving Review. 1941, 9, 2, 121-129.

The author describes a safety program of eye conservation in the mining industry. Safety goggles have always been advocated and since 1930 have been supplied without cost to the employee. This has resulted in an average 300 per cent reduction in serious eye accidents when the men were made to wear the goggles. For employees who have an uncorrected visual acuity of less than 20/40 in one or both eyes an eye examination is suggested. The company recommends that employees consult a medical eye specialist for this examination. Many of them consult optometrists, however, and prescriptions from optometrists are accepted. The employee pays the examination fee. Prescription protection glasses are supplied to these employees without cost to the men. Seip indicates that there has developed a gradual acceptance of the safety program among the employees. C. C. K.

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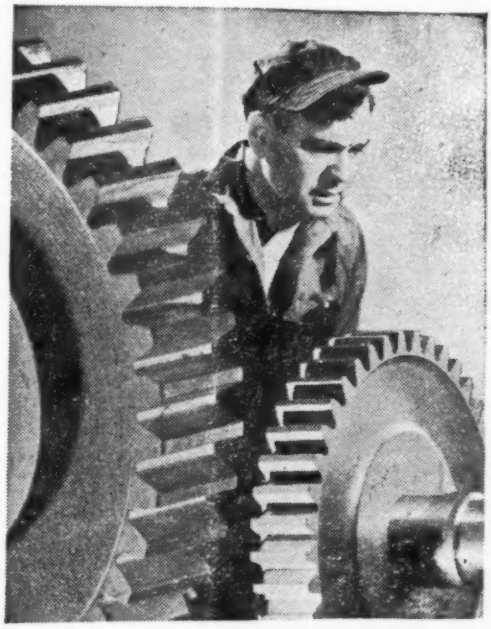

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No Optometrist and certainly no student can afford to be without this text which in every sense ranks with that of Helmholtz and Donders. It will hold your interest as no other text in Physiologic Optics has ever done—every page, every diagram—for it is written in a style which because of the sincere simplicity of expression will make you want to read on and on. In simple, easy and absorbing manner, it discusses the most complex of psychophysiological problems.

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Dr. Noyes in *Optical Journal and Review of Optometry.*

"This superb book . . . contains a wealth of collateral information with which (the optometrist) would do well to familiarize himself . . . It has not been the privilege of these reviewers to read a better or more comprehensive study of the structure and functions of the human eye."

Drs. Ryer and Hotaling in
*Journal American Optometric Association.*

"Highly successful."

Dr. Gruman in *Pennsylvania Optometrist.*

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Mr. C. B. B.—aircraft worker,* wore white crown lenses until job was changed to working on highly polished metal. Complained of glare and discomfort. Soft-Lite Lenses, *in the same correction,* were prescribed to bring full satisfaction.

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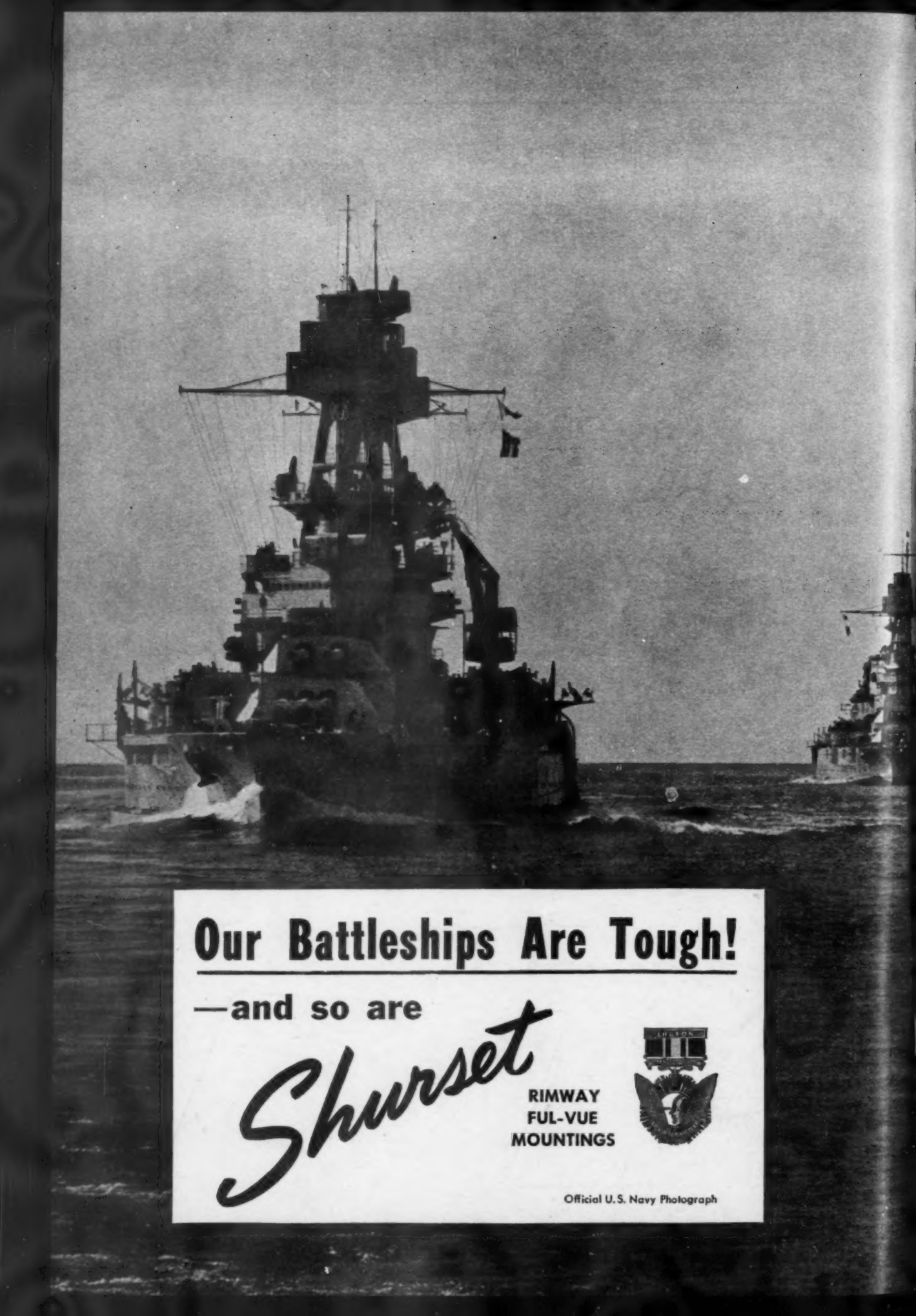
*When supplies of Soft-Lite Lenses are limited—use them *first* for fighting men and war workers. When they need the protection of Soft-Lite they *deserve* first consideration.

Soft-Lite Lenses

*Name and address of refractionist who reported this case history available upon request.*



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